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10/676,795

09/30/2003

Mark R. Richards

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7590

01/11/2005

Michael A. Bernadicou  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
Seventh Floor  
12400 Wilshire Boulevard  
Los Angeles, CA 90025

EXAMINER

SMOOT, STEPHEN W

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/676,795 | <b>Applicant(s)</b><br>RICHARDS ET AL. |  |
|                              | <b>Examiner</b><br>Stephen W. Smoot  | <b>Art Unit</b><br>2813                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 21-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-20 are drawn to a memory cell, classified in class 257, subclass 295.
  - II. Claims 21-30 are drawn to a method for constructing a memory cell, classified in class 438, subclass 3.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, such as a process that includes a roughening step in order to form the as-claimed roughness formations.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone message exchange with Michael Bernadicou on 15 December 2004 a provisional election was made with traverse to prosecute the invention of group I, claims 1-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 21-30 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Drawings***

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign mentioned in the description:  
52 in Fig. 5 (see paragraph [0026]).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification (see paragraph [0028]) needs to be amended to provide antecedence for the 600 to 1000 angstroms height range corresponding to the roughness formation as claimed in claims 9, 18.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-3, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishikawa et al. (US 2001/0050869 A1).

Referring to Figs. 1(g), 2-3 and paragraphs [0018] to [0037], Nishikawa et al. disclose a ferroelectric memory cell structure with the following features:

- A substrate (14);
- An electrode layer (15) on the substrate (14);
- A ferroelectric layer (13) on the electrode layer (15) that can be a polymer ferroelectric (see paragraph [0021]);
- The ferroelectric layer (13) has concave and convex portions;
- An anisotropic conduction film (17) formed on the ferroelectric layer (13) that is thicker than the depth of the concave portions corresponding to the ferroelectric layer (13);
- A second electrode layer (19) formed on the anisotropic conduction film (17); and
- The electrode layers (15, 19) combined with the ferroelectric layer (13) form capacitors for retaining information in memory cells (see paragraph [0037]) (i.e.

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the ferroelectric polymer is capable of maintaining a charge after a voltage is applied across the electrodes).

These are all of the limitations set forth in claims 1-3, 11 of the applicant's invention.

10. Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. (US 2003/0017623 A1).

Referring to Fig. 6 and paragraphs [0016] to [0052], Li et al. disclose a ferroelectric polymer memory structure with the following features:

- A substrate (12);
- The substrate (12) can be silicon and may include integrated circuit structures like MOS transistors (also see paragraph [0060]);
- The substrate (12) may include an interlayer dielectric like silicon oxide (see paragraph [0034]);
- A first electrode (18) formed on the substrate (12) that can be aluminum (see paragraph [0025]);
- A ferroelectric polymer layer (30) formed on the first electrode (18);
- The ferroelectric polymer (30) can be fluorine containing material like polyvinylidene fluoride and trifluoroethylene copolymer (see paragraph [0045]);
- An upper protective film (36) on the ferroelectric polymer layer (30) that can be titanium dioxide (see paragraphs [0030], [0031], [0050]);

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- The upper protective film (36) has a thickness that can range from 10 nm to 100 nm (i.e. 100 to 1000 angstroms) (see paragraph [0031]);
- A second electrode (38) on the upper protective film (36) that can be aluminum (see paragraphs [0025], [0050]);
- The cross points corresponding to the intersections of first and second electrodes (18, 38) combined with the intervening ferroelectric polymer (30) form memory elements (see paragraphs [0050], [0051]) (i.e. the ferroelectric polymer is capable of maintaining a charge after a voltage is applied across the electrodes); and
- Regarding the roughness formations limitation of independent claims 1, 11, it would be inherent for the upper surface of the ferroelectric polymer layer (30) to have some degree of roughness.

These are all of the limitations set forth in claims 1-20 of the applicant's invention.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ljungcrantz et al. teach a ferroelectric memory cell structure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS

*Stephen W. Smoot*  
Patent Examiner  
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